

Feed conversion efficiency of regenerative compared with conventional dryland sheep production systems

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Abstract

The feed conversion efficiency of a regenerative dryland sheep production system was compared with a conventional system at two soil Olsen P levels (10–15 and 20–25 mg/kg) in Years 3 (2023–24) and 4 (2024–25) of an on-going experiment at Lincoln University. There were four 1.936-ha farmlets, each stocked with mixed-age Bohepe ewes and their progeny. The two systems were not different in dry matter (DM) intake (average 7.30 t/ha per year) and there was no effect of soil P fertility. However, the feed conversion efficiency for the Regenerative system was lower by 29 kg of liveweight gain/t of DM intake in Year 3 and by 20 kg of liveweight gain/t of DM intake in Year 4. In Year 3, the DM intake for the Regenerative system was composed of 0.24 t/ha less crude protein (CP), 0.76 t/ha more neutral detergent fibre (NDF) and a 5.3:1 lower CP-to-metabolisable energy (ME) ratio. In Year 4, it comprised 1.31 t/ha less legume, 0.26 t/ha less CP and 2.6:1 less CP:ME. These results show that the Regenerative system produced less sheep liveweight gain from a similar quantity of lower quality feed consumed than the Conventional system.

Keywords: *Dactylis glomerata*, *Lolium multiflorum*, *Medicago sativa*, multispecies, sustainability, *Trifolium subterraneum*

Introduction

In New Zealand dryland pastoral systems, achieving rapid lamb growth during spring and early summer is critical for profitable sheep production. Early finishing of lambs reduces the period over which maintenance requirements must be met and allows more pasture to be allocated to breeding ewes in summer. Pasture species and grazing management are important factors for maintaining lamb growth rates under water-limited conditions (Moot et al. 2020).

Pasture management systems influence pasture structure and composition, which in turn strongly affect grazing behaviour, feed intake and animal performance. Therefore, differences in pasture management may also influence the efficiency with which forage is converted into animal products (Baumont et al. 2000). In recent years, increasing societal expectations for environmentally sustainable farming have stimulated

interest in alternative production systems that aim to enhance soil health, biodiversity and ecosystem resilience while maintaining agricultural productivity (Gerber et al. 2013; Foote et al. 2015). One such approach is regenerative agriculture, which generally involves practices such as increased pasture diversity, reduced synthetic inputs and adaptive grazing management (Newton et al. 2020; Rowarth et al. 2020). Proponents of regenerative agriculture suggest that these practices can improve soil function and pasture productivity while sustaining livestock performance. However, empirical evidence that compares the productivity of regenerative agriculture systems remains limited, particularly under temperate dryland grazing conditions (Rowarth et al. 2020).

Recent research from the Regenerative Agriculture Dryland Experiment (RADE) at Lincoln University has begun to quantify the effects of regenerative practices and soil phosphorus (P) fertility on sheep production in a summer-dry environment. Results from this experiment showed that a Regenerative system of pastures, winter forages and grazing techniques produced significantly greater forage dry matter (DM) than a Conventional system, yet this increase did not translate into improved sheep production (Robb et al. 2025; 2026). Specifically, in Year 3 of the experiment (July 2023–June 2024), the Regenerative system produced 1.55 t/ha more DM and maintained an average farm cover that was 0.88 t DM/ha greater than the Conventional system, but sheep liveweight production was 131 kg/ha (23%) lower for the Regenerative system. In Year 4 (July 2024–June 2025), the Regenerative system yielded 130 kg/ha less live weight and 0.77 t/ha less DM than the Conventional system. There was no effect of soil P fertility (Olsen P 10–15 and 20–25 mg/kg) in either year. These findings highlight that greater DM production does not necessarily result in improved livestock performance. Differences in feed utilisation, feed intake and feed conversion efficiency into liveweight gain may explain the discrepancy between feed supply and animal output.

Therefore, the objective of this study was to compare the feed intake and feed conversion efficiency of the Regenerative and Conventional systems at the two levels of soil P fertility. These metrics provide key indicators of livestock performance and may help explain previously reported differences in DM and

sheep production across these contrasting farming systems.

Materials and Methods

The RADE is a 2×2 factorial farmlet experiment at Lincoln University, New Zealand ($43^{\circ}38'54.20''\text{S}$, $172^{\circ}27'34.30''\text{E}$). It was established between December 2021 and June 2023 (Years 1 and 2). The treatments are Regenerative and Conventional sheep production systems and two levels of soil P fertility (Olsen P 10–15 and 20–25 mg/kg in the top 75 mm of the soil). The four treatment combinations are arranged in five 4×4 Latin squares (80 plots), with the restriction that each treatment occurs once in each row and once in each column in each Latin square. Plot size is 0.087–0.132 ha. Consequently, each treatment is replicated on 20 plots across the experiment, forming four farmlets of 1.936 ha each. Details of the experimental design are described in Watson et al. (2024) and Robb et al. (2025; 2026).

For this study, the annual feed intake and feed conversion efficiency of each farmlet were quantified for Year 3 (July 2023–June 2024) and Year 4 (July 2024–June 2025) of the experiment. The materials and methods for these 2 years are described in detail in Robb et al. (2025; 2026) and summarised here.

The Regenerative system consisted of multispecies pastures (12 sown species), multispecies winter forage crops (eight sown species), short duration-high density rotational stocking and no pesticides. In summer, there were 12 plots of multispecies with lucerne (*Medicago sativa* L.) pasture and eight plots of multispecies with balansa clover (*Trifolium michelianum* Savi) pasture, where the lucerne was replaced with balansa clover to enable autumn sowing. In winter, there were 10 plots of multispecies/lucerne, eight plots of multispecies/balansa and two plots of annual multispecies forage, in an 'old' pasture – crop – 'new' pasture rotation. All sowing rates and cultivars are listed in Robb et al. (2025). The short duration-high density grazing method involved one group of ewes that was moved to a new plot every 2–3 days in a 16–20-plot rotation in spring–autumn (early August–mid May). In winter, the group was usually moved to a fresh break of pasture or crop every 2 days and to a new plot every 4–6 days in a complete 20-plot rotation. Two plots of multispecies/balansa were cut for hay in December.

The Conventional system was designed to represent current New Zealand summer-dry sheep production practices, based on published recommendations for dryland lucerne monoculture management (Moot et al. 2003; 2016). It comprised lucerne pastures, cocksfoot/subterranean (sub) clover (*Dactylis glomerata* L./*T. subterraneum* L.) pastures, annual ryegrass (*Lolium multiflorum* Lam.) winter forage crops, longer duration-

lower density rotational stocking and herbicide inputs. There were 12 plots of lucerne and eight plots of cocksfoot/sub clover in summer and 10 plots of lucerne, eight plots of cocksfoot/sub clover and two plots of annual ryegrass in winter, in an 'old' pasture – crop – 'new' pasture rotation. The ewes were divided into two groups, with each group usually moved to a new plot every 4–6 days in an 8–10-plot rotation in spring–autumn, and to a new break every 2 days and new plot every 8–12 days in a 10-plot rotation in winter. Two plots of cocksfoot/sub clover were cut for hay in December.

The annual stocking rate was not different across all four treatments in Years 1–4, with 20 ewes and five hoggets/farmlet (12.9/ha) in Year 3 and 24 ewes and four hoggets/farmlet (14.5/ha) in Year 4. The breed of the ewes and hoggets was Bohepe, which is a composite of wild sheep breeds, East Friesian, Finnish Landrace, Wiltshire and Merino (Beattie 2022). Lambing occurred in mid-August–mid-September, weaning in early December, mating with Bohepe and Suffolk rams in March–April and pregnancy scanning in July. After weaning, the lambs grazed ahead of the ewes in a leader-follower grazing system. Prime lambs (≥ 36 kg) and store lambs (< 34 kg) were removed in December–February. The ewes were shorn in December, and the hoggets were shorn in March.

The unfasted live weight of each animal was measured at birth, monthly (including at weaning and before and after shearing) and whenever an animal was added to or removed from a farmlet. Liveweight gain/animal was calculated as the change in live weight since the previous weighing and was assumed to be zero during shearing. Liveweight gain/animal was divided by the plot area to express it on a per-hectare basis. This was summed across all animals within each farmlet and across all weighing events within each year to calculate annual liveweight gain/ha.

Pasture and crop intake was measured as the change in herbage mass and composition immediately before and after grazing. Herbage mass and composition were measured by cutting one representative 0.5 m² quadrat in each third of the plot to 1–2 cm above ground using electric sheep shears. The cut material was combined in one bag. The whole sample was weighed to determine the fresh weight of the whole plant material. A sample of 100–200 g of this material was taken and its fresh weight determined. Another sample of about 400 pieces was separated into each sown species, weed (unsown species) and dead material. Both samples were placed into a 65°C oven and dried for at least 48 h to constant weight. The dry weights of the composite sample and each separated component were determined. The dry composite sample was ground to pass through a 2-mm sieve and its concentrations of crude protein (CP),

Table 1 Classification of Regenerative and Conventional forage systems into forage groups according to pasture and crop sequence.

Forage Group	Regenerative	Conventional
1: Pastures with lucerne	Multispecies/lucerne	Lucerne monoculture
2: Pastures without lucerne	Multispecies/balansa	Cocksfoot/sub clover
3: 'Old' pasture with lucerne – Crop	Multispecies/lucerne – Annual multispecies	Lucerne – Annual ryegrass
4: Crop – 'New' pasture without lucerne	Annual multispecies – Multispecies/balansa	Annual ryegrass – Cocksfoot/sub clover
5: Crop – Crop	Annual multispecies – Annual multispecies	Annual ryegrass – Annual ryegrass

metabolisable energy (ME) and neutral detergent fibre (NDF) determined by near-infrared spectroscopy. From these values, pasture and crop DM, legume, CP, ME and NDF intakes were calculated on a per-hectare basis.

Hay and whole barley were fed to the animals as supplementary feed sources when pasture growth was limited by winter cold or summer moisture deficit. The quantity of hay and barley offered to each treatment group was recorded at each feeding event. They were offered at levels intended to minimise wastage, so refusals were negligible, and the amount offered was assumed to be consumed.

Hay DM supplied was calculated from the number of bales offered to each plot, the fresh weight and DM concentration determined for each bale, and the plot area, thereby expressing supplementary feed supply on a per-hectare basis. Hay CP, ME and NDF supplied were calculated by multiplying hay DM by nutrient concentrations of 15% CP, 9.5 MJ ME/kg DM and 55% NDF. Barley DM supplied was calculated from the fresh weight offered and a DM concentration of 90%, while barley CP, ME and NDF supplied were calculated using nutrient concentrations of 12% CP, 13 MJ ME/kg DM and 21% NDF. The hay DM on offer was less for the Regenerative than Conventional system in Year 3 (536 versus 753 kg/ha) and Year 4 (260 versus 361 kg/ha) and not affected by soil P fertility in both years. No barley was offered in Year 3, and 26 kg/ha of barley DM was offered for each farmlet in Year 4.

The components of hay and barley offered were added to those of pasture and crop intake to calculate the total feed DM, legume, CP, ME and NDF intakes for each grazing event. These values were summed across all grazing events within each year. DM intake was also expressed per kilogram of annual liveweight gain/hectare. The reciprocal of this value was the feed conversion efficiency. CP:ME intake ratio was calculated as annual CP intake divided by ME intake.

The annual intake data were analysed with general analysis of variance for treatment comparisons within whole farmlets and within forage groups. The whole farmlet analysis had a treatment structure as System*Fertility and a block structure as Square/

(Row*Column). The forages were distributed across the block structure and categorised according to five groups (FG1–5;) to represent the cycle of forages available as a farm system undergoes the on-going process of pasture renewal. This cycle results in some areas of the farmlets transitioning from one forage to another. The forage groups represent pastures with lucerne (FG1), pastures without lucerne (FG2), those pastures transitioning to winter feed, from pasture with lucerne (FG3) and back to pastures without lucerne (FG4) and repeat winter forage crops (FG5). This allowed the analysis of the contribution of these forage groups to the total farmlet production. This analysis had the System*Fertility treatment structure and Row as a block factor, because each FG occurred in one or more complete rows of the Latin square design. Specifically, in Year 3, FG1 occurred in 10 rows of Latin Squares 1, 2 and 4, FG2 in eight rows of Latin Squares 3 and 5, FG3 in Row 1 of Latin Squares 1 and 4 and FG4 in Rows 3 and 4 of Latin Square 3. In Year 4, FG1 occurred in 10 rows of Latin Squares 1, 2 and 4, FG2 in the eight rows of Latin Squares 3 and 5, while FG3 occurred in Row 2 and FG5 in Row 1 of Latin Square 4.

Feed conversion efficiency was analysed within whole farmlets only, since this response had farmlet as the experimental unit, System and Fertility as the treatment structure (i.e. no interaction term) and the two levels of each other treatment factor as pseudo-replicates. Statistical significance was declared at the 5% level for each response with plot as the experimental unit and at the 10% level for feed conversion efficiency, due to its low replicability. All analyses were done in GenStat software.

Results

Treatment effects within whole farmlets

There were effects of system and no effects of soil P fertility on feed intake and feed conversion efficiency at the whole farmlet level (Table 2). In Year 3, the two systems did not differ in DM intake, but the Regenerative system had a 5 kg/ha greater ($P<0.001$) DM intake per kilogram of liveweight gain per hectare. Therefore, its feed conversion efficiency was lower

Table 2 Dry matter (DM) intake, expressed per hectare and per kilogram of liveweight gain (LWG) per hectare, and its legume, crude protein (CP), metabolisable energy (ME), neutral detergent fibre (NDF) and CP:ME composition for Regenerative and Conventional dryland sheep production systems over 2 years.

Year	System	DM (t/ha)	DM (kg/kg LWG)	Legume (t/ha)	CP (t/ha)	ME (GJ/ha)	NDF (t/ha)	CP:ME
Year 3 (2023–24)								
	Regenerative	7.81	15.8	2.97	1.39	88.2	2.96	15.5
	Conventional	6.76	10.8	3.86	1.63	80.8	2.20	20.8
	SED ¹	0.59	0.34	0.56	0.12	6.12	0.34	0.89
	P Value	0.078	0.004	0.120	0.048	0.240	0.028	<0.001
Year 4 (2024–25)								
	Regenerative	7.41	10.3	3.17	1.57	88.5	2.34	18.0
	Conventional	7.22	8.5	4.48	1.83	89.3	2.06	20.6
	SED	0.50	0.64	0.60	0.11	5.04	0.23	0.77
	P Value	0.713	0.100	0.032	0.020	0.870	0.240	<0.001

¹SED = Standard Error of the Difference

($P<0.001$) by 29 kg of liveweight gain for every tonne of DM intake. The DM intake for the Regenerative system was composed of 0.24 t/ha less CP ($P<0.05$), 0.76 t/ha more NDF ($P<0.05$) and a 5.3:1 lower CP:ME ratio ($P<0.001$).

In Year 4, the two systems were not different in DM intake, but the Regenerative system had a 1.8 kg/ha greater ($P=0.1$) DM intake per kilogram of liveweight gain per hectare, making its feed conversion efficiency lower ($P=0.1$) by 20 kg of liveweight gain per tonne of DM intake. The DM intake for the Regenerative system was made up of 1.31 t/ha less legume ($P<0.05$), 0.26 t/ha less CP ($P<0.05$) and a 2.6:1 lower CP:ME ratio ($P<0.001$).

Treatment effects within forage groups

There were effects of system and no effects of soil P fertility on feed intake within forage groups (Table 3). In Year 3, multispecies/lucerne had a 1.91 t/ha greater ($P<0.05$) DM intake than lucerne, but its DM intake comprised 2.04 t/ha less legume ($P<0.001$), 0.45 t/ha less CP ($P<0.01$), 2 t/ha more NDF ($P<0.001$) and 8.8:1 lower CP:ME ($P<0.001$). Multispecies/balansa and cocksfoot/sub clover were not different in DM intake, but the DM intake for multispecies/balansa had 1.90 t/ha more legume ($P<0.01$). The multispecies/lucerne – annual multispecies combination had a similar DM intake with 2.30 t/ha less legume than lucerne – annual ryegrass ($P<0.05$), and annual multispecies – multispecies/balansa had a similar DM intake with a 2.9:1 lower CP:ME than annual ryegrass – cocksfoot/sub clover ($P<0.001$).

In Year 4, multispecies/lucerne and lucerne did not differ in DM intake, but the multispecies/lucerne DM

intake had 4.88 t/ha less legume ($P<0.001$), 0.66 t/ha less CP ($P<0.001$), 14.4 GJ/ha less ME ($P<0.05$) and 3.6:1 lower CP:ME ($P=0.001$). Multispecies/balansa had 1.75 t/ha more DM intake ($P<0.05$) with 2.79 t/ha more legume ($P<0.001$) than cocksfoot/sub clover. Multispecies/lucerne – annual multispecies and lucerne – annual ryegrass did not differ in DM intake, but the DM intake for multispecies/lucerne – annual multispecies had 3.78 t/ha less legume ($P=0.001$), 1.19 t/ha less CP ($P<0.01$) and 44.7 GJ/ha less ME ($P<0.05$). Annual multispecies and annual ryegrass repeated for a second year were not different.

Discussion

The results from this study show that the Regenerative system produced less live weight from a similar quantity of lower-quality feed consumed than the Conventional system. This lower feed conversion efficiency into liveweight gain helps to explain previously reported differences in sheep production and DM production across these contrasting farming systems. Robb et al. (2026) reported that the Regenerative system produced about 130 kg/ha less live weight than the Conventional system in Years 3 and 4, but the Regenerative system produced more DM in Year 3 and a similar quantity of DM in the following year. This discrepancy between feed supply and animal output may now be explained by the lower feed conversion efficiency.

The DM intake in the Regenerative system was accompanied by lower CP intake and greater NDF intake (Table 2), which indicates that forage nutritive value, rather than forage quantity, ultimately determined feed conversion efficiency. Both systems were managed at the same annual stocking rate despite

Table 3 Dry matter (DM) intake and its legume, crude protein (CP), metabolisable energy (ME), neutral detergent fibre (NDF) and CP:ME composition for different forages in Regenerative and Conventional dryland sheep production systems over 2 years.

Year	Forage Group	System	DM (t/ha)	Legume (t/ha)	CP (t/ha)	ME (GJ/ha)	NDF (t/ha)	CP:ME
Year 3 (2023–24)								
1: Pastures with lucerne								
		Regenerative	8.17	3.23	1.42	91.5	3.49	15.4
		Conventional	6.26	5.27	1.87	77.3	1.49	24.2
		SED ¹	0.76	0.47	0.15	7.84	0.41	0.8
		P Value	0.015	<0.001	0.003	0.075	<0.001	<0.001
2: Pastures without lucerne								
		Regenerative	8.22	2.65	1.46	92.8	2.75	15.2
		Conventional	7.26	0.75	1.26	84.1	3.23	15.2
		SED	0.98	0.6	0.19	10.1	0.53	1.78
		P Value	0.328	0.003	0.291	0.393	0.367	0.109
3: 'Old' pasture with lucerne – Crop								
		Regenerative	6.9	3.5	1.57	84.8	1.61	18.2
		Conventional	6.75	5.8	1.98	82.9	1.37	24.4
		SED	1.74	1.07	0.33	17.9	0.94	1.57
		P Value	0.931	0.036	0.221	0.914	0.797	0.058
4: Crop – 'New' pasture without lucerne								
		Regenerative	5.66	0.42	0.84	61.1	2.32	13.7
		Conventional	5.47	0.62	1.05	66.8	2.32	16.6
		SED	1.69	1.05	0.32	17.4	0.92	1.57
		P Value	0.91	0.849	0.518	0.743	0.999	<0.001
Year 4 (2024–25)								
1: Pastures with lucerne								
		Regenerative	8.28	2.92	1.53	83.3	2.18	19.2
		Conventional	9.46	7.8	2.19	97.7	1.75	22.8
		SED	0.68	0.37	0.13	6.8	0.34	1.03
		P Value	0.089	<0.001	<0.001	0.038	0.21	0.001
2: Pastures without lucerne								
		Regenerative	8	3.84	1.61	92.4	2.5	17.6
		Conventional	6.25	1.05	1.45	78.4	2.18	19.4
		SED	0.72	0.39	0.13	7.19	0.36	1.09
		P Value	0.018	<0.001	0.232	0.056	0.381	0.096
3: 'Old' pasture with lucerne – Crop								
		Regenerative	4.03	2.54	0.96	51.3	1	19.3
		Conventional	7.67	6.32	2.15	96	1.91	23
		SED	2.1	1.12	0.39	20.9	1.04	3.15
		P Value	0.088	0.001	0.003	0.036	0.387	0.25
5: Crop – Crop								
		Regenerative	9.51	0.67	1.76	114.5	2.73	13
		Conventional	6.41	0.00	1.24	85	2.43	12.4
		SED	2.1	1.12	0.39	20.9	1.04	3.15
		P Value	0.144	0.489	0.182	0.164	0.775	0.86

¹SED = Standard Error of the Difference

differences in forage production. In addition, the Regenerative system was intentionally managed to retain greater post-grazing residuals to maintain ground cover and long-term ecosystem services rather than maximise short-term forage utilisation. In Years 3 and 4, the lower feed conversion efficiency suggests that forage nutritive value, particularly CP and NDF intake, may have been more influential than total feed intake alone in determining animal performance. This was shown by the observed differences in compositional intake. Increased NDF intake reduces digestibility and intake efficiency, thereby limiting the availability of ME to the animal (Mertens and Grant 2020). ME intake in the Regenerative system was not different in Year 3. Rather, the reduced CP intake in the Regenerative system seems most likely to have constrained rumen microbial protein synthesis, thereby reducing overall feed utilisation efficiency (Poppi and McLennan 1995). In contrast, the Conventional system, with higher CP intake, would support more efficient rumen function and consequently animal growth despite similar total DM intake. In Year 4, any differences in intake between systems were less pronounced, particularly for DM and ME intake, suggesting a reduced treatment contrast. However, the Regenerative system still exhibited lower CP intake, reinforcing the hypothesis that nutritional balance, rather than total feed supply, governed efficiency outcomes.

Forage type influenced intake and feed composition across both years. Lucerne monocultures in the Conventional system consistently produced higher legume intake and CP intake, while grass-based multispecies regenerative pastures tended to maximise DM intake, ME intake and NDF intake, particularly in Year 3 (Table 3). These findings are consistent with established literature demonstrating that legumes such as lucerne provide high protein concentrations due to biological nitrogen fixation, whereas grass-dominated or multispecies swards often provide greater biomass but lower protein concentrations (Lüscher et al. 2014). The higher CP content in lucerne systems reflects greater nitrogen availability and greater digestibility, which enhance intake and animal performance (Min et al. 2003). In contrast, multispecies pastures may improve productivity through niche complementarity and extended seasonal growth, but this does not necessarily translate into higher nutritive value (Sanderson et al. 2004; Black et al. 2017) or animal production (Robb et al. 2025; 2026).

Forages based on pasture – annual crop combinations showed greater variability across years, particularly for DM and ME intake, due to climate variability. This variability is well documented in rainfed systems on the east coast of New Zealand, and coping with this variability has been the basis of developing the

conventional dryland systems used in this experiment over the last 30 years (e.g. Avery et al. 2008; Grigg et al. 2008). These results highlight that the botanical composition was the key driver of feed quality (Van Soest 1994; Lüscher et al. 2014), with the legume-rich Conventional system enhancing protein supply and the multispecies Regenerative system enhancing total feed production.

The CP:ME intake ratio provides an integrated measure of the balance between CP and ME intake. Across both years, the Conventional system consistently exhibited a higher CP:ME intake ratio than the Regenerative system, indicating a greater supply of CP relative to available ME (Table 2). Although the CP concentrations of all pastures exceeded the minimum levels generally considered adequate to support normal rumen microbial activity (Poppi and McLennan 1995), the consistently lower CP:ME intake ratio in the Regenerative system suggests that the balance between CP and ME intake may have influenced feed utilisation beyond absolute protein supply alone. One possible explanation is that sheep grazing regenerative pastures increased DM intake to compensate for this nutritional imbalance, consistent with evidence that ruminants can adjust feed intake to meet nutrient requirements when dietary protein and energy are not optimally balanced (Asher et al. 2011). This interpretation is supported by the similar DM intake, but lower feed conversion efficiency observed in the Regenerative system. In Year 4, the difference in the CP:ME intake ratio between systems was smaller, although it remained highly significant, suggesting partial convergence in nutritional balance that corresponded to reduced differences in CP intake and pasture composition. Despite this convergence, the consistent system effect across both years indicates that management system influenced the balance of CP intake and ME intake. Soil P fertility had no effect on CP:ME in either year, indicating that differences in nutrient balance were driven primarily by farming system and botanical composition rather than soil fertility. This is consistent with the established influence of pasture species composition on forage nutritive value within typical soil fertility ranges (Whitehead 2000).

Conclusions

The Regenerative system consumed a similar quantity of DM, but consistently had lower CP intake, higher NDF intake and lower feed conversion efficiency than the Conventional system. These differences in feed intake characteristics may help explain the previously reported 130 kg/ha-lower liveweight production of the Regenerative system despite its greater pasture supply. The Regenerative system had a lower CP:ME intake ratio, which may explain the lower feed conversion

efficiency despite greater DM availability. Although differences between systems were smaller in the second year, the overall pattern was consistent across both years. These findings suggest that CP-to-ME balance, rather than feed quantity alone, was an important determinant of feed utilisation efficiency under the conditions of this study. Improving the Regenerative system may require adjustments to pasture species composition, including increasing the proportion of legumes and herbs relative to grasses.

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