Flexible Milking Review

Flexible milking regimes, a deviation from the twice a day (TAD) traditional system and therefore a reduction in number of milkings, have become more common for many New Zealand dairy farmers for a multitude of reasons. Some reasons include benefits to the team (hours worked, number of early starts, recruitment and retention) along with improved body condition score (which may lead to improved reproductive results), reduced walking (which may lead to reduced lameness) and changes in variable costs, such as electricity, shed expenses and fuel. Once a day (OAD) milking does occur in New Zealand, however due to reduced production and perceived reduced profit, it is not widely adopted.

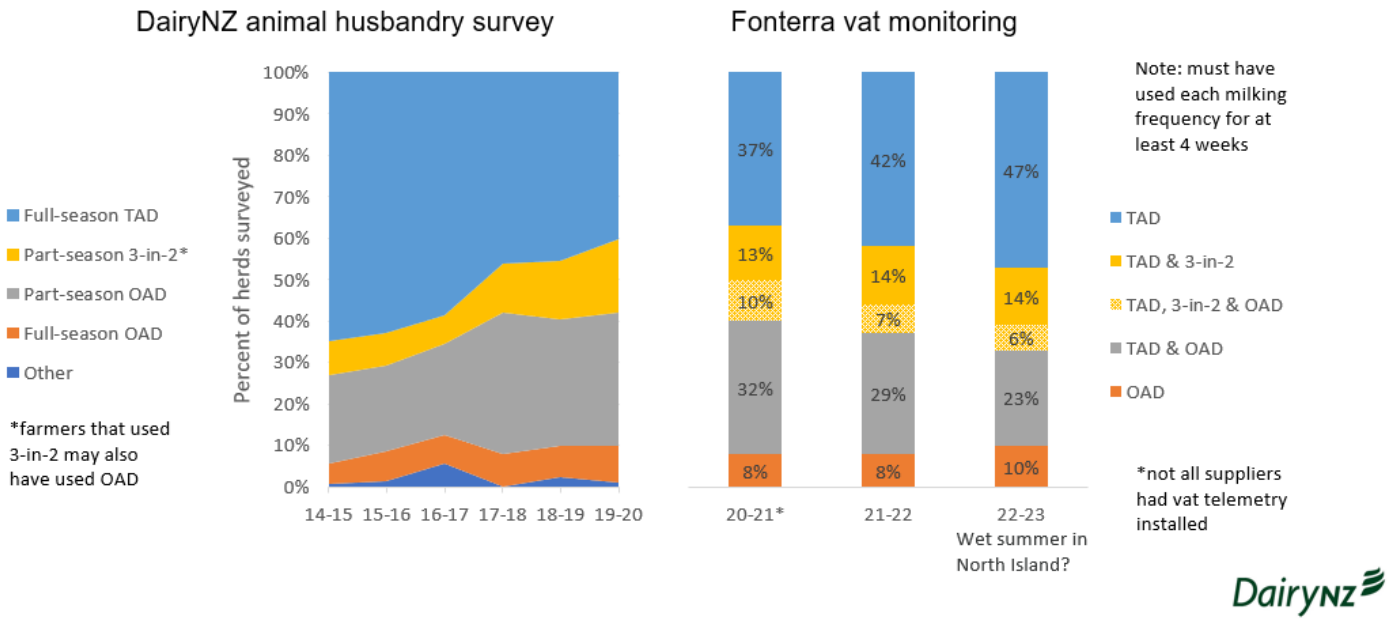
Flexible milking also reduces some variable costs due to a reduced number of milkings. It was expected that fuel, electricity, shed costs and labour demand would reduce.

LUDF implemented this system after the DairyNZ led research *"Flexible Milking for Healthier People & Cows"* project. This project aimed to increase farmer and rural professional confidence to adopt, optimise and support the use of flexible milking approaches to enable better work-life balance and sustainability for people, cows and their business. This research did show reduced milking times, had a limited effect on production, improved BCS and lameness was reduced.

Milking frequency over time can be seen in the below graphs. Full season TAD had been decreasing over time, where part season variable milking had been increasing. OAD has remained relatively static. This data was collated via the DairyNZ animal husbandry survey. *Note a percentage of farmers are surveys annually and provides a representation.*

Data from Fonterra farmers, through vat telemetry, indicates that farmers are adapting their system. Seasonal event may also be a driver. Please note each segment utilised the introduced milking frequency for at least 4 weeks to meet the criteria for that segment. This highlights more information is required around full or part time flexible milking.

Adoption of flexible milking frequency over time



Number of milkings for milking regime

Regime	Milkings per fortnight	Milkings per year	Reduction in milkings	% drop
TAD	28	600	0	0%
OAD	14	300	300	50%
3 in 2	21	450	150	25%
10 in 7	20	429	171	29%

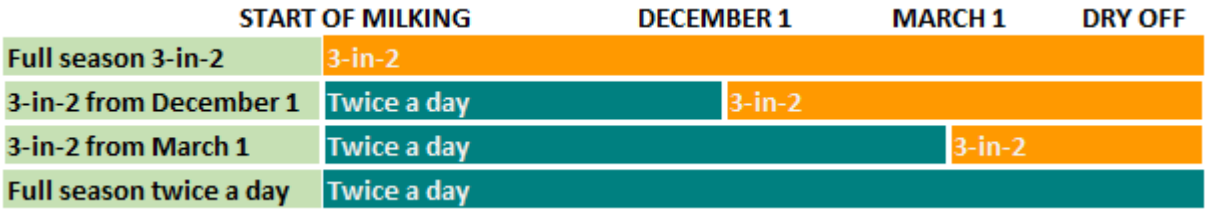
DairyNZ's flexible milking research compared three variations of 3-in-2, compared to a twice a day (TAD) system in a farmlet study. This looked at different start dates: from calving, 1 December and 1 March. This was to compare a traditional TAD system, to a mating/summer dry decision and an end of season/BCS decision.

Milking times were:

- TAD: 6am – 4pm (10-14)
- 3-in2: 5am – 5pm – 11am (12-18-18)
- Stocking rate: 3.5 cows/ha (29 cows/herd, 31% heifers)

Lincoln University Research Dairy Farm

Milking regimes:

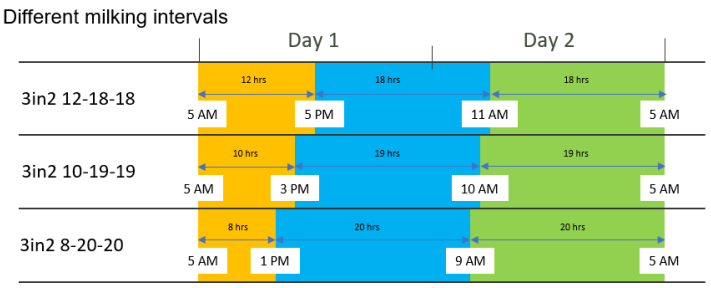


DairyNZ's flexible milking research compared three variations of 3-in-2, compared to a twice a day (TAD) system in a farmlet.

A second, component experiment sought to answer the question "Is it the number of milkings per day, or the timing of them that affects production?"

Design:

- 2× 6-week experiments
- 34 and 146 DIM (spring and summer)
- Herds of 40 cows
- Grazed side-by-side
- 3× 3-in-2 milking intervals.

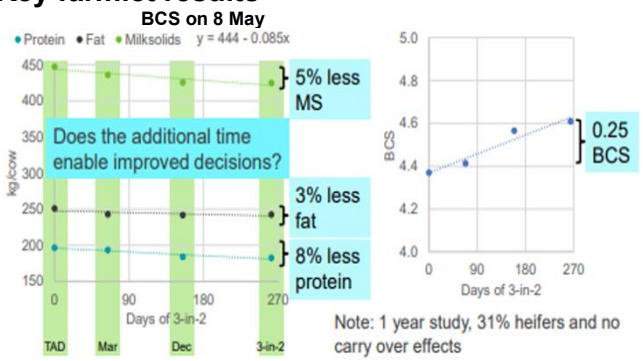


Key findings from research:

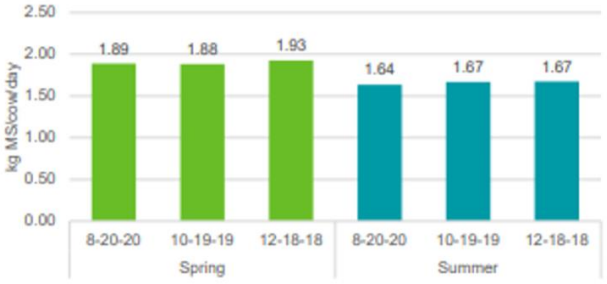
- 5% difference in milk solid production from the date that 3-in-2 was implemented. This was primarily driven by protein (-8%, statistically significant), rather than fat (-3% not statistically significant).
- BCS near dry off was +0.25 (6%) for the full season 3-in-2. All treatments had a linear increase in BCS from the date that that 3-in-2 was implemented.
- Note this was a 1-year farmlet study, so the value of this greater BCS could not be determined in terms of winter feeding, early lactation milk production or fertility. The controlled design of the experiment and small size of the research farm may mean greater benefit on a commercial farm.
- There are no statistically significant differences in milk production in spring and summer between different milking intervals in the 3-in-2 milking times. Likely a small biological effect on protein. Therefore, possible to use more attractive flexible milking times.

For more information, please visit https://www.dairynz.co.nz/milking/milking-intervals/flexible-milking/.

Key farmlet results



Results



- No significant difference between groups
- Possible to use more attractive 3-in2 milking times.

MythBusters

- You're going to make me work late.
- You must milk at 5PM on the TAD day.
- My cows will tank if I go 3-in-2 or 10-in-7.
- 3-in-2 will help me save feed
- You feed your cows less … you have to feed your cows to capacity.
- Flexible milking will affect my conception rates.
- Milkings times will be longer.
- You can't go changing milking frequency if you are doing more than 1.7 kg MS/cow.

10-in-7 at LUDF

SIDDC's strategic purpose is 'to lead and promote the very best sustainable dairy food production systems', to achieve this there are 6 principals to guide SIDDC actives and projects.

They are:

1. People at the core of farm activities;
2. Activities must be supported by the broader community;
3. Mātauraka Māori be adopted;
4. The focus must be on future consumers;
5. Activities must be at the forefront of environmental sustainability, commercial profitability, animal care, and employment relations;
6. Activities will be informed by sound science and underpinned by robust and transparent data collection and analysis.

The flexible milking project has been pursued as it aligns with principle number one - people at the core of farm activities. This was first implemented in the 2021-22 season.

The anticipated impact at LUDF was:

- 6% decrease in lactation curve, with one less milking per fortnight that 3-in-2. TAD - 500 kg MS/cow therefore 10-in-7 = 470 kg MS/cow.
- 25% decrease in petrol and motorbike R&M.
- 13% reduction in power consumption.
- 25% reduction in shed cleaning costs.
- Winter feed costs to reduce by $1.80/week. This is based on feed cost $0.29/kg DM and a BCS of 0.23 higher at dry off.
- Lameness targets were 0%. Based on $40/cow, this equated to a decrease in animal health by $4.80/cow.
- Labour requirement reduced from 19% less time milking. This equated to a 0.33 drop in FTE = $19.5k p.a. This is a combination of fewer milkings and less milking time.

Farm System:

- Stocking rate to remain at 3.5 cows/ha – winter approx. 580 cows, peak milk 560 cows.
- Culls to be removed in April, as per current farm policy, this is to mitigate risk of autumn leaching of N.
- Nitrogen fertiliser use to not exceed 190 kg N/ha.
- Spring/early summer surplus taken as silage and fed in autumn.
- Production target 263,200 (470 kg MS x 560 cows) down from TAD 279,266 (503 kg MS x 555 cows).
- Reduction of 16,066 kg MS.

So how has it gone at LUDF?

LUDF has now completed its third season of full-time flexible milking with a 10 milkings in 7 days strategy, known as 10-in-7.

The first two seasons were relatively wet seasons, where we did see a regional drop in production. At the start of our third season we did see a significant drop in milk in early August. This resulted in a governance discussion as to whether LUDF should revert to TAD over calving to alleviate milk solid loss, however it was decided to continue on the path of 10-in-7 to show the impacts over the full three seasons.

				TAD					10-in-7				
KPI	Projected	Change from TAD to 10-in-7	This season	2018/19	2019/20	2020/21	TAD avg	Change	10-in-7 avg	2021/22	2022/23	2023/24	Notes
Total milk production	263,625	8%	-6%	277,293	280,123	280,381	279,266	-23,254	256,012	258,851	247,291	261,894	
Number of cows	560	0%	1%	550	555	560	555	-1	554	542	560	560	
Production per cow	475	8%	-7%	504	505	501	503	-41	462	478	442	468	
Production per ha	1,648	8%	-6%	1,733	1,751	1,752	1,745	-145	1,600	1,618	1,546	1,637	
Petrol Use	25% drop	-28%	19%	2,425	1898	2540	2,288	-637	1,650	1,401	1,700	1,850	Number of FTE
Bike R & M	25% drop	NC	NC					0					No change
Power consumption	13% drop	-15%	21%	173,983	157,716	164,400	165,366	-24,356	141,011	138,737	154,411	129,884	
Shed cleaning costs	25% drop	-23%	23%	2,752	2,752	2,752	2,752	-628	2,124	2,124	2,124	2,124	
Winter feed costs	-$1.80/week	-$1.96	-$1.96					$ 0.16					Feeding to BCS
Lameness Numbers	0	NC	NC					0					
Animal health	$40/cow	NC	NC					0					
Labour - FTE	$19.5k drop	NC	NC	3.5	3.5	3.5	3.5	-0.7	2.8	2.5	2.5	3.5	
Hours milked - total		-21%	20%	1,125	1,128	1,174	1,142	-245	898	916	863	915	
Hours milked - per day		-21%	19%	3.64	3.64	3.87	3.7	-0.8	3.0	3	2.86	3	

Production:

- The first two seasons for 10-in-7 were wet compared to average, which caused a drop in production across Canterbury.
- We were forecasting a 6% drop off our average production of 280,000, which would be 263,200 kg MS.
- LUDF drop in production was 7.5% in the first season (21/22) and 11% in the second season (22/23). However, the region experienced a 3.5% drop followed by a 5% drop.
- On the assumption that LUDF would track with the region, the 10-in-7 drop was 4% and 6%, respectively.
- One thing to note is that feed grown, and pasture eaten has reduced over this period which has resulted in an increase in supplement fed, which has had an impact on profitability. This is considered not to be attributed to 10-in-7.
- For comparison to benchmark all production data is calculated on kg MS/ha basis.

Milk Production Benchmark

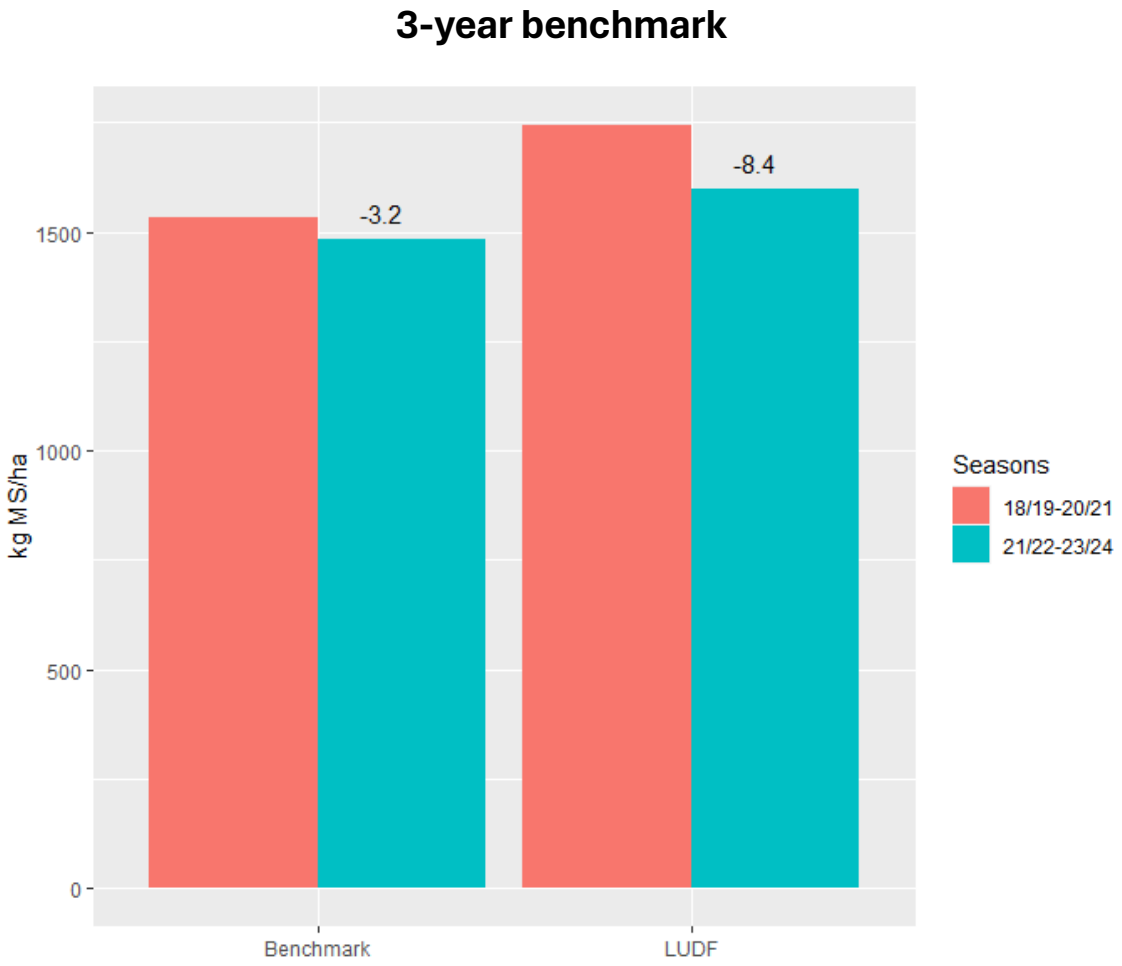
Fonterra has created a benchmark for LUDF to compare to. The criterion was they must be:

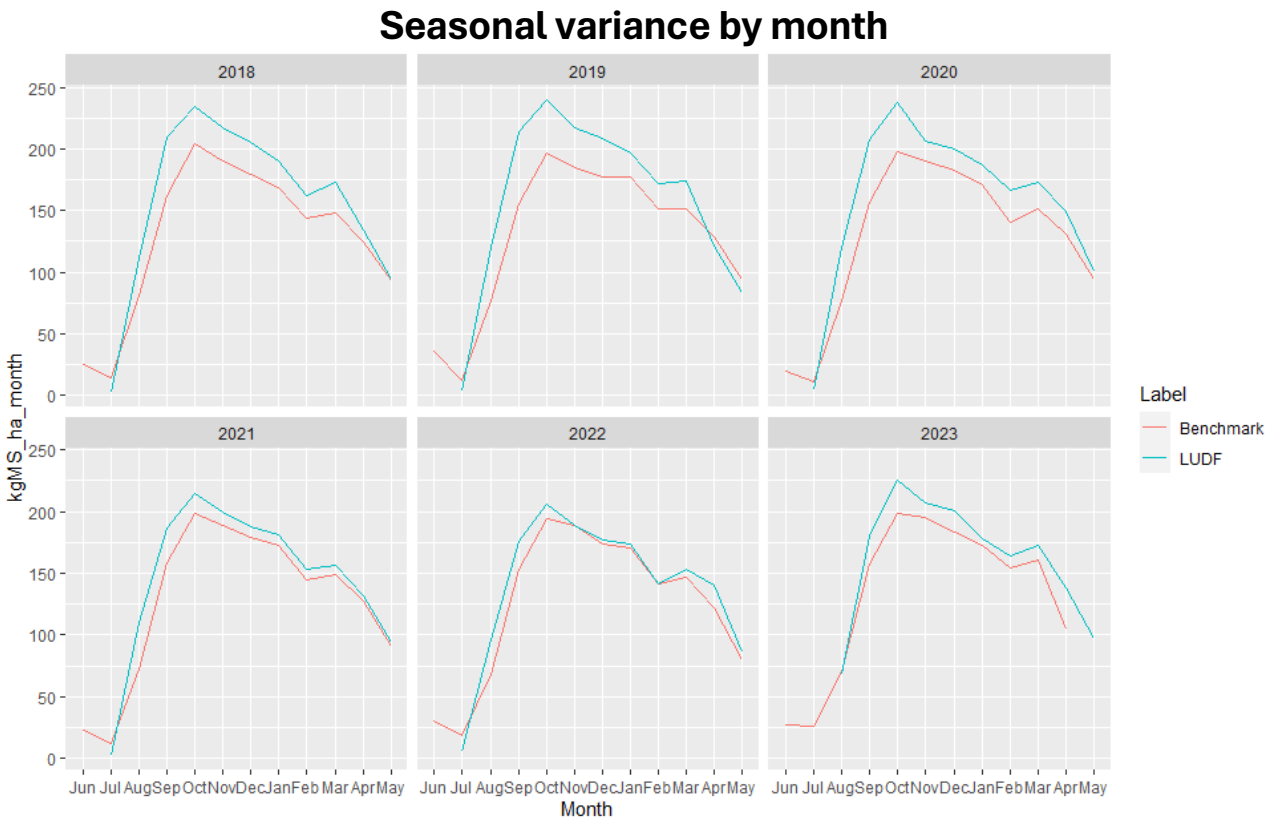
- Spring calving.
- No change in ownership.
- TAD for 86-100% of their days of supply.
- Irrigated dairy platform.
- Producing >1,000 kg MS/ha.
- Geographical location in close proximity.

This resulted in a benchmark of 12 farms.

Milk Production Benchmark

The benchmark has taken a 3-year average over the TAD period (2018-19 to 2020/21) and 10-in-7 period (2021-22 to 2022-2024).



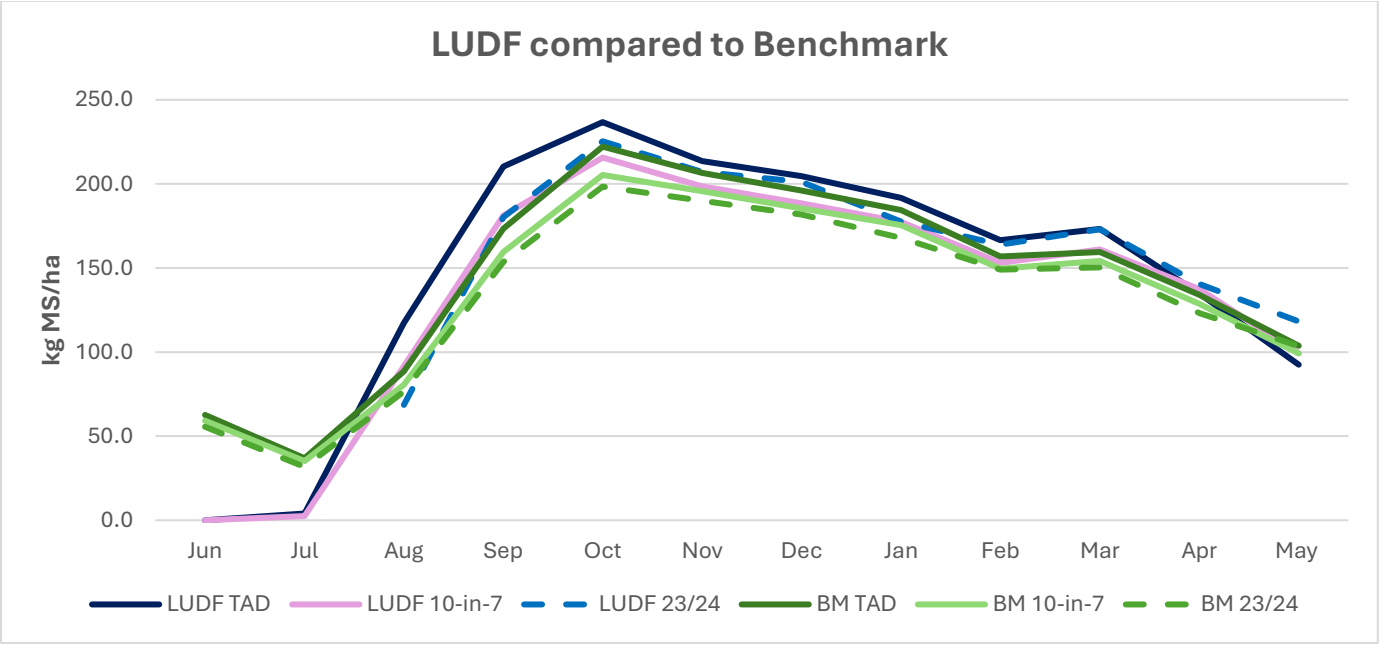


This reporting supports that the benchmark did see a 3.2% drop in production over the 10-in-7 period compared to the TAD period, whereas LUDF had an 8.4% drop for the same period. Suggesting that compared to benchmark LUDF resultant production drop was 5.2%, which we will attribute as a 10-in-7 effect.

The data has also been shown on a monthly basis per year. This suggests that LUDF and the benchmark primarily do follow a similar trend over the season over the TAD period.

For the 10-in-7 period, the first two season (wetter than average), confirms that "gap" between groups narrows which suggests that this is not purely a seasonal effect and that it is a system effect. What is interesting is that for a more "normal" season that LUDF has gained on the benchmark, particularly over the peak in autumn production, which is consistent with previous performance.

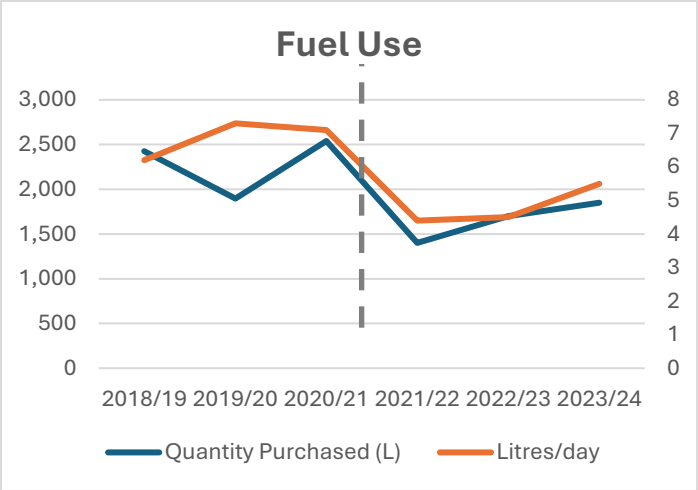
LUDF is continuing to implement full 10-in-7 milking regime for the 2024-25 season and we look forward to seeing if we can further improve the system and continue with a 5-6% production drop, or if we can in fact close the gap.

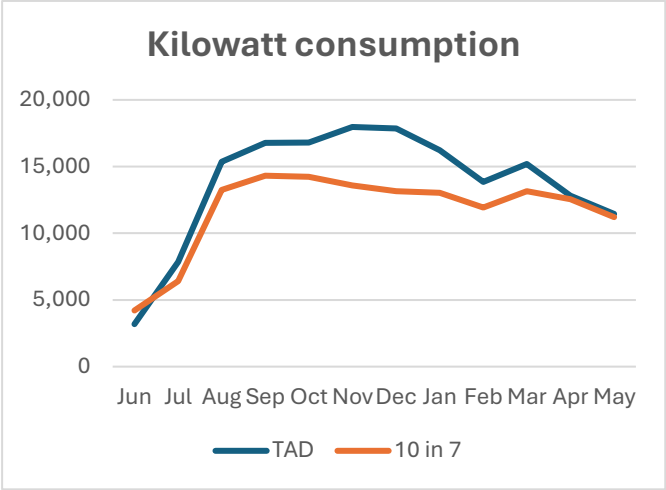


	LUDF TAD	LUDF 10-in-7	LUDF 23-24	BM TAD	BM 10-in-7	BM 23-24
TOTAL	1,745	1,600	1,637	1,725	1,628	1,582

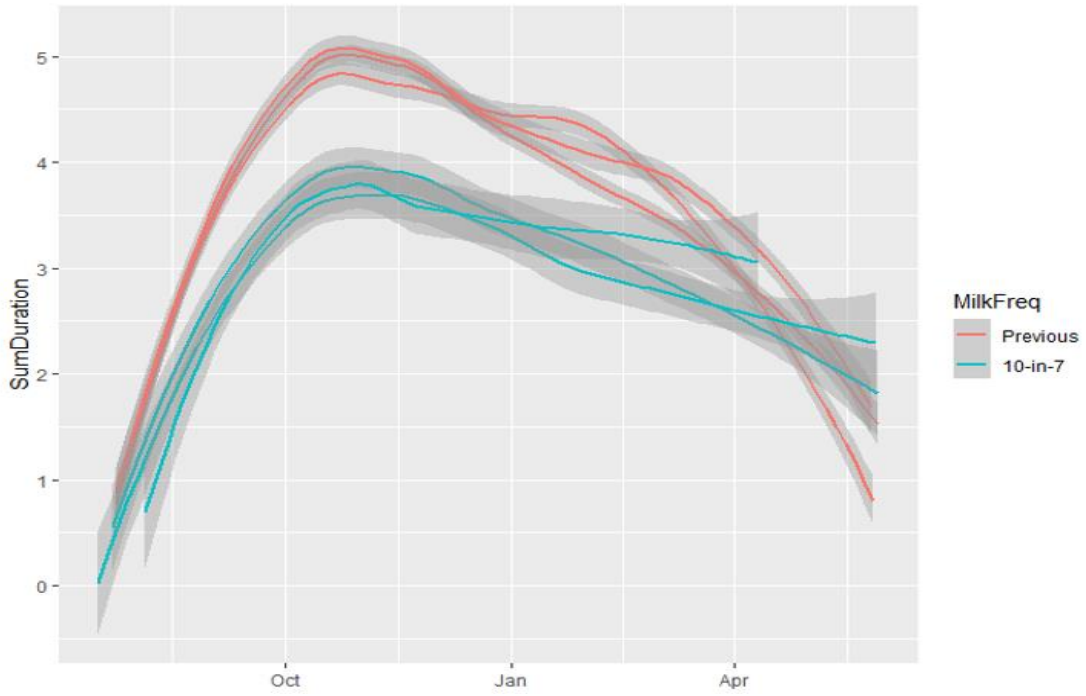
From the above you can see the shift in production for LUDF from TAD to 10-in-7, and the improvement for 23/24 season. The benchmark did follow a similar trend, however LUDF production from March did lift in line with pre 10-in-7 production.

Cost comparison:

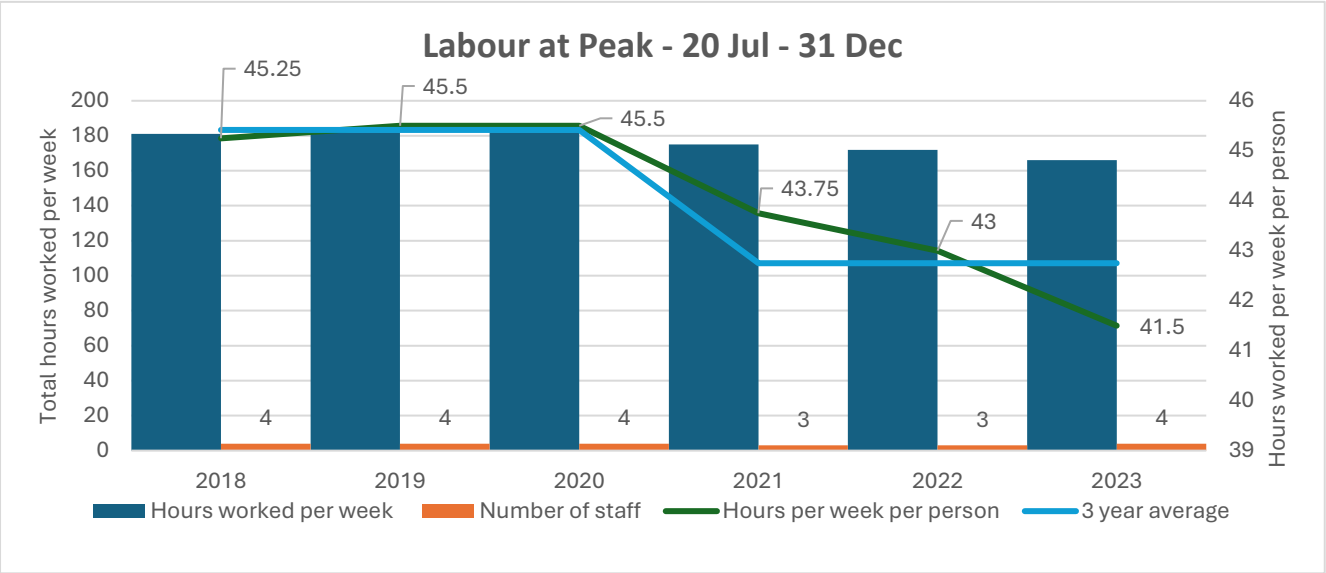




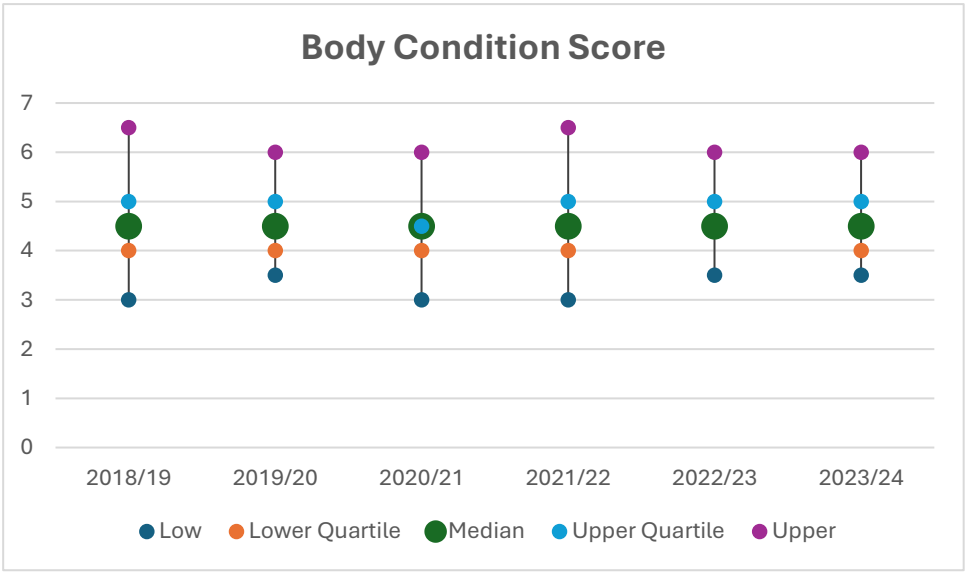
Hours milked per day from Halo data:



Labour:



Body Condition Score:



BCS is trending up, however the main driver here is BCS at dry off and winter feeding, however we have noticed cows holding condition better, particularly at the tail end of the season, and the spread, particularly the lower quarter, has improved. Is this from flexible milking? Or better transition feeding, or seasonal?

Where to from here ...

LUDF has successfully implemented 10-in-7 milking regime and has delivered 6.2% drop in production per hectare and 7.1% drop per cow for the 23/24 season. When compared to the benchmark LUDF has delivered a 5.2% drop in production per hectare over the 3-year period. As with every farm, with every season there are many variables, and we look to the 24/25 season to further refine our system aiming for 470 kg MS/cow or 1,645 kg MS/ha.