

Willowcliff Case Study

Executive Summary

Willowcliff farm is a dairy farming operation in the lower South Island region of North Otago. In 2022 the business adopted Halter prior to the start of the 2022/23 milking season. Relative to the 2021/22 season pre-Halter, the 2023/24 season with Halter saw pasture eaten per effective grazed hectare increase by 22% or 2.4TDM/ha. This pasture eaten increase was achieved with an increase in Nitrogen fertiliser of 72 kgN/ha relative to the pre-Halter season (the fertiliser policy changed also – at a 10:1 assumed response rate the additional nitrogen would equate to approximately 610kgDM or 0.6TDM/ha additional pasture harvested). Production increased by 17% per cow, plus the farm saw improved reproductive performance shown by a 5% increase in 6 week in-calf rate and an 4% reduction in not-in calf (empty) rate. Staffing levels across the operation were reduced by 2 full time equivalents (FTE) with Halter, while staff engagement, job satisfaction and staff retention have all been lifted measurably with Halter.

Table 1: Willowcliff Performance Before and Post Implementation of Halter

Season	Pre-Halter: 2021/22	Halter: 2023/24	Percentage Change
Pasture Eaten – kgDM/ha (Grazed Hectares)	10,790	13,190	22.2%
Kilograms of Milk Solids per Cow – kgMS/cow	452	529	17.0%
Kilograms of Milk Solids per Hectare – kgMS/ha (Total Hectares)	1561	1853	18.7%
Nitrogen Fertiliser -kg N/ha (Total Hectares)	90	162	80.0%
6 Week in Calf Rate - ICR	64%	69%	5.0%
Not in Calf (Empty) rate	19%	15%	-4.0%
Cows/FTE	167	231	38.3%
Earnings Before Interest and Taxes (EBIT) Per Hectare	\$6190	\$7992	29.1%

Farm Background

Willowcliff farm lies 40 kilometres inland of Oamaru and has been operated by Nathan & Kirsty McLachlan since 2011. The farm was originally converted from sheep & beef to dairy in 2011 with Nathan project managing the conversion and initially managing, until sharemilking and then advancing into ownership.

The dairy farm has a 363 hectare effective dairy platform on flat to rolling country with predominantly Ngapara silt soils and peak milks around 1,270 cows. The farm has a 60-bail rotary cow shed with in-shed feeding and operates a spring calving system with all cows wintered off the dairy platform. The farm is fully irrigated using water from the NOIC irrigation scheme. Irrigation water is applied through a mix of centre-pivot, fixed-grid and K-line systems.

Soil moisture monitoring and irrigation scheduling are used to optimally utilise the irrigation water resource.

Operating as a System 4, the farming system leverages in-shed meal feeding using grain, palm kernel and dried distillers grain (DDG) to maximise cow intakes, leverage optimal cow potential and generate profitable production in a pasture-based system. Around 30 hectares of fodderbeet are grown on the dairy farm platform for autumn feeding, pre-wintering transition and spring feeding to cows. The Friesian cross herd have an average BW of around 280 and produce over 110% of liveweight as milksolids.

Reasons for Halter

Nathan & Kirsty are strong proponents of technology in dairy systems and initially saw the potential of Halter to assist with staffing efficiency and retention as well as supporting higher pasture harvested. With 2 ½ seasons of experience of using Halter, Nathan has found multiple other benefits that Halter has brought to the farm system and their whole operation, including improved mental clarity on farm operations and performance, and less worry about staff.

Management Changes Made

In the 2 ½+ seasons with Halter Nathan has extended management changes enabled by Halter well beyond what he thought was initially possible, changes made have included:

GRAZING MANAGEMENT

The previous grazing regime management had centred around using information from weekly pasture walks and some time using *pastureio* which targeted matching round lengths to growth rate. Nathan is finding that the accuracy of Halter data in the pasture module is improving rapidly. He has found that pre-grazing covers and residuals plated are ending up within +/- 50kgDM/ha of the Halter predicted covers. As such he has good trust in Halter data now – to the extent that in the current milking season in spring he had the confidence to open cows up onto a spring rotation around 16-18th September on Willowcliff, which flowed through to holding better pasture quality into second and third grazing rounds. In terms of breaks per day Nathan now sets up more breaks in longer covers but in general operates on 6-8 breaks per day per herd as standard operating practice, and he believes this is an important driver in lifting cows total feed intakes.

In terms of virtual fencing and paddocks – the platform still has all fences in place - Nathan may still remove some, but is still considering this opportunity and how best to do it. One of the challenges with creating larger paddocks is paddock limitations – currently being able to only graze one herd per paddock so consideration is needed.

TRANSITION AND WINTERING

Wintering has been completely re-engineered through the capabilities of the Halter system – Nathan is able to make sure 2,500 cows on crop are fed from the breakfast table – this doesn't remove the need to go and physically observe and assess conditions on the ground, but removes the time pressure and a lot of the stress of being out for long periods in challenging winter conditions. There is more control on fodderbeet using Halter – with ability to take animals off crop as and when is needed to manage intakes and ground conditions. The use of a portable tower unit at the grazing block allows these benefits to be gained. Cows are block

grazed initially to open crop paddocks up until long feeding faces are established, so a combination of area and time are used initially.

For transition colostrum cow management and the ability to run extra herds is much easier. Calving recovery data is being used but baseline data based on pre-calving baseline means you do have to interpret data to get the best outcomes. Regular shifts for colostrum cows are driving rumination data recovery well by 2-3 days. Break management includes two hourly day breaks and bigger night breaks.

ENVIRONMENTAL

Nathan is not using grazing heat map data yet but can see this data building up - which could in the future be used with selective grid soil testing to better manage fertiliser and nutrient use efficiency. Pugging damage has been reduced massively with it being easier to manage & move cows as needed in adverse conditions – cows can also be spread out onto bigger areas and brought back onto the same break areas when rainfall has subsided to get grazing residuals tidy. Nathan has utilised Halter to keep cows out of critical source areas (CSA's) when conditions have dictated this need so that soil disturbance and loss to waterways can be significantly reduced.

LABOUR

One of the primary motivations for using Halter was to gain some labour efficiencies on a 1200+ cow farm – Halter has enabled a permanent reduction of two FTE's (pre-Halter had 7.5 FTE's vs 5.5 FTE's with Halter) as well as freeing up time for the staff to do higher value tasks.

One of the key benefits found from using Halter is less pressure on staff – this flows through to staff retention being very good. The farm does employ seasonal staff (backpackers) and the core staff have remained unchanged (with the exception of a 2IC who has progressed to contract milking on another farm). Nathan believes that Halter is driving better work satisfaction with staff – as evidenced by the minimal turnover.

Staff are more engaged in the farming operation and performance – the pasture module has been a significant factor in this. There have been improvements in quality of decision making- despite there being less people on farm every person has more responsibility and access to real time information. Typically, there is only one person in the milking shed, the cows come in, and the staff member only calls in support if needed. The dairy shed is well tech-equipped with ACRs, protrack drafting, automatic teat spraying and an automatic backing gate.

Nathan has found one main challenge of less time observing out on farm as Halter reduces time needed in the paddock. They have overcome this by having a strong communication of tasks through a group chat. Another observation (not fully quantified yet) is that mileage and maintenance requirements of motorbikes have been reduced.

REPRODUCTION & ANIMAL HEALTH

Prior to Halter the mating program was using conventional heat detection with tail paint and scratchies. Halter has enabled some significant gains in reproductive performance with a 5% increase in 6 week in-calf rate and a 4% reduction in not-in calf (empty) rate. Typically, the program was always to continue mating until New Year- last year Nathan stopped at Christmas due to confidence in the results to that date.

In regards to animal health, lameness rates have so far not reduced with Halter but have been stable. Mastitis has not improved under Halter yet and overall death rate has remained at the same level.

INTANGIBLE BENEFITS

Mentally the technology is good - it helps you at all times to see where you are at. Nathan has strong trust in the data – and can make good decisions based on good data.

Overall, there has been less worry about staff and less issues. It is easier to replace staff as being a Halter farm is a strong drawcard.

The investment in Halter was weighed up against converting more K-line irrigation area to fixed grid irrigation. Halter for Nathan & Kirsty has created returns which increases options for other capital development – a strong cash business which Halter underpins.

Financial

Financial results are modelled using a standardised approach across all case studies. The overall change in EBIT between the 2021/22 season (pre-halter) and the 2023/24 season (with halter) showed an increase in Earnings Before Interest and Tax (EBIT) of 29%. Pre-Halter EBIT was \$6190 per hectare while post implementation of Halter saw an increase to \$7992 per hectare.

Conclusion

The adoption of Halter at Willowcliff Farm has led to substantial improvements across key operational metrics, demonstrating the impact of this technology on an intensive irrigated dairy system. Increased pasture harvested per hectare, enhanced milk production per cow, and improved reproductive performance have solidified the farm's efficiency gains. Additionally, a reduction in staffing requirements while simultaneously improving engagement and job satisfaction highlights the broader benefits Halter has introduced.

Beyond the measurable improvements, the integration of Halter has redefined grazing management, wintering strategies, and environmental stewardship, offering greater control and adaptability in daily operations. These changes have not only optimized resource use but also reduced stress levels for both farm owners and staff, contributing to a more sustainable and productive farming environment.

Looking ahead, continued refinement of management practices using Halter data will likely unlock further efficiencies. As technology continues to evolve, Willowcliff Farm is well-positioned to build on its success, leveraging digital insights for even greater productivity and operational clarity.

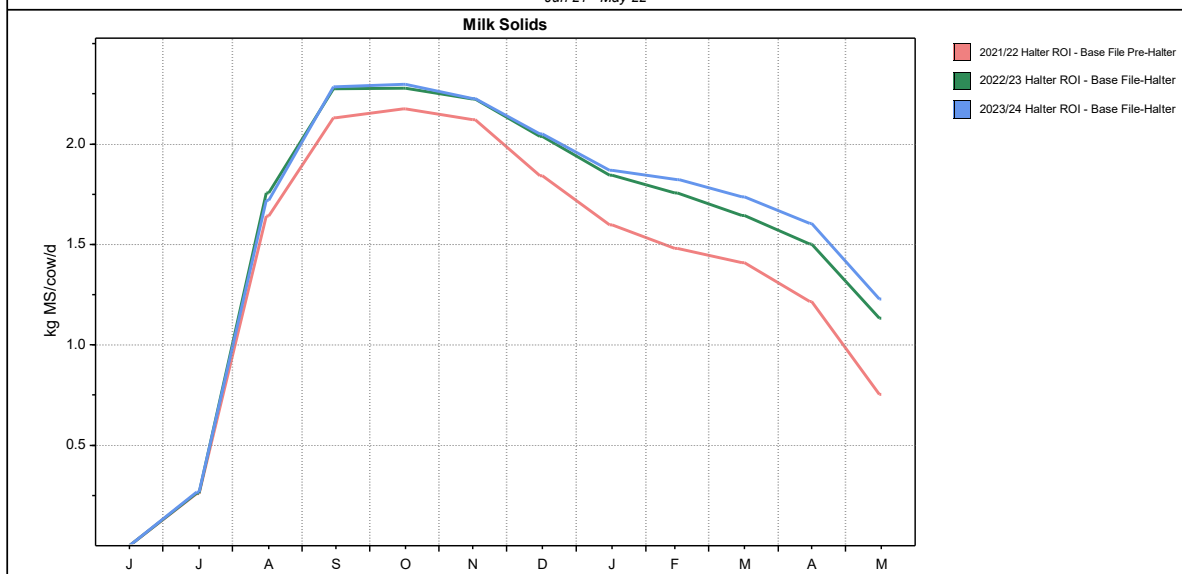
Appendix: Farmax Modelling Summaries

FARMAX		Compare Physical Summary			
		Jun 21 - May 22			
		2021/22 Halter ROI - Base File Pre-Halter	2022/23 Halter ROI - Base File-Halter	2023/24 Halter ROI - Base File-Halter	
Farm	Effective Area	363	363	363	ha
	Stocking Rate	3.5	3.6	3.5	cows/ha
	Comparative Stocking Rate	98.4	88.5	89.0	kg Lwt/t DM eaten
	Potential Pasture Growth	14.4	13.5	15.4	t DM/ha
	Nitrogen Use per graze ha	100	182	185	kg N/ha
	Feed Conversion Efficiency (eaten)	10.4	9.9	9.9	kg DM eaten/kg MS
Herd	Cow Numbers (1st July)	1,268	1,323	1,277	cows
	Peak Cows Milked	1,252	1,317	1,269	cows
	Days in Milk	267	263	278	days
	Avg. BCS at calving	5.4	5.4	5.6	BCS
	Liveweight per graze ha	1,775	1,766	1,860	kg/ha
Production (to Factory)	Milk Solids total	565,843	648,276	671,635	kg
	Milk Solids per graze ha	1,739	2,021	2,113	kg/ha
	Milk Solids per cow	452	492	529	kg/cow
	Peak Milk Solids production	2.20	2.32	2.31	kg/cow/day
	Milk Solids as % of live weight	98.0	114.5	113.6	%
Feeding	Pasture Eaten per cow *	2.74	2.69	3.24	t DM/cow
	Supplements Eaten per cow *	1.35	1.57	1.45	t DM/cow
	Off-farm Grazing Eaten per cow *	0.59	0.61	0.54	t DM/cow
	Total Feed Eaten per cow *	4.68	4.86	5.23	t DM/cow
	Pasture Eaten per graze ha	10.79	11.26	13.19	t DM/ha
	Supplements Eaten per graze ha	5.22	6.46	5.82	t DM/ha
	Off-farm Grazing Eaten per graze ha	4.63	5.30	4.98	t DM/ha
	Total Feed Eaten per graze ha	20.65	23.02	23.99	t DM/ha
	Supplements and Grazing / Feed Eaten *	41.47	44.72	38.00	%
	Bought Feed / Feed Eaten *	19.06	24.64	21.61	%
Diagnostics	Cow Pasture Eaten	3,432.76	3,537.88	4,117.52	t DM
	Cow Total Supp Feed Eaten	1,688.99	2,061.69	1,841.85	t DM
	Cow Total Grazing Feed Eaten	743.71	800.93	681.31	t DM
	Cow Total Eaten	5,865.45	6,400.50	6,640.68	t DM
	Cow Bought Feed Eaten	1,118.22	1,577.37	1,434.77	t DM
	All Pasture Eaten	3,510.83	3,612.28	4,191.62	t DM
	All Total Supp Feed Eaten	1,698.29	2,071.00	1,851.15	t DM
	All Total Grazing Feed Eaten	1,507.73	1,699.10	1,583.74	t DM
	All Total Eaten	6,716.85	7,382.38	7,626.51	t DM
	All Bought Feed Eaten	1,118.22	1,577.37	1,434.77	t DM
Total Cow Dec Lwt		577,291	566,383	591,246	kg

(*) feed eaten by females > 20 months old / peak cows milked

Compare Milk Solids

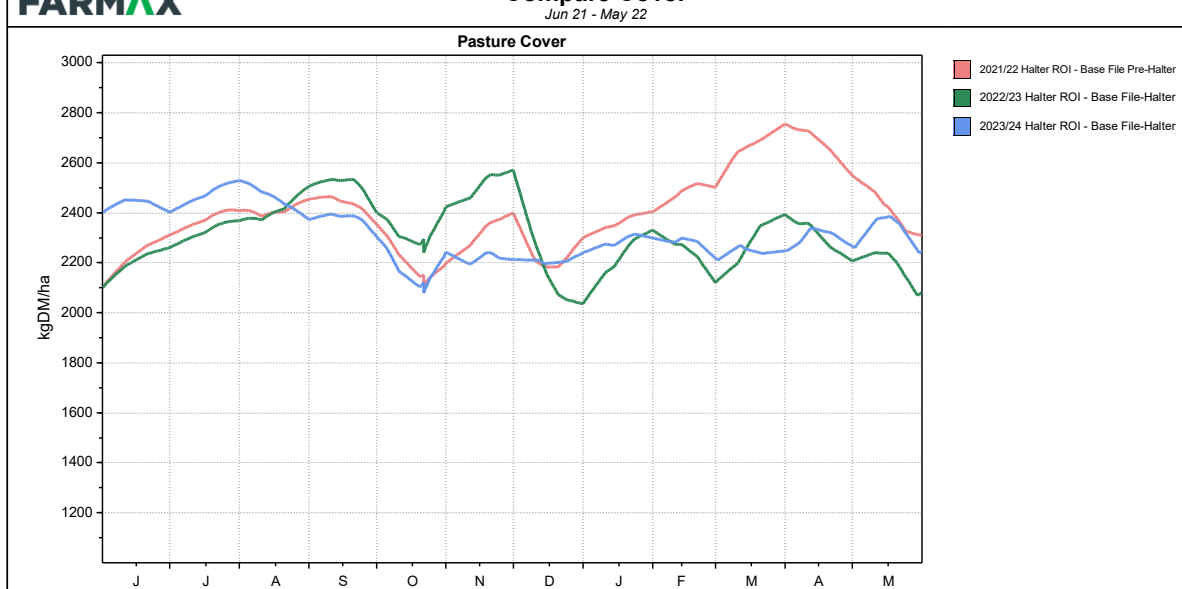
Jun 21 - May 22



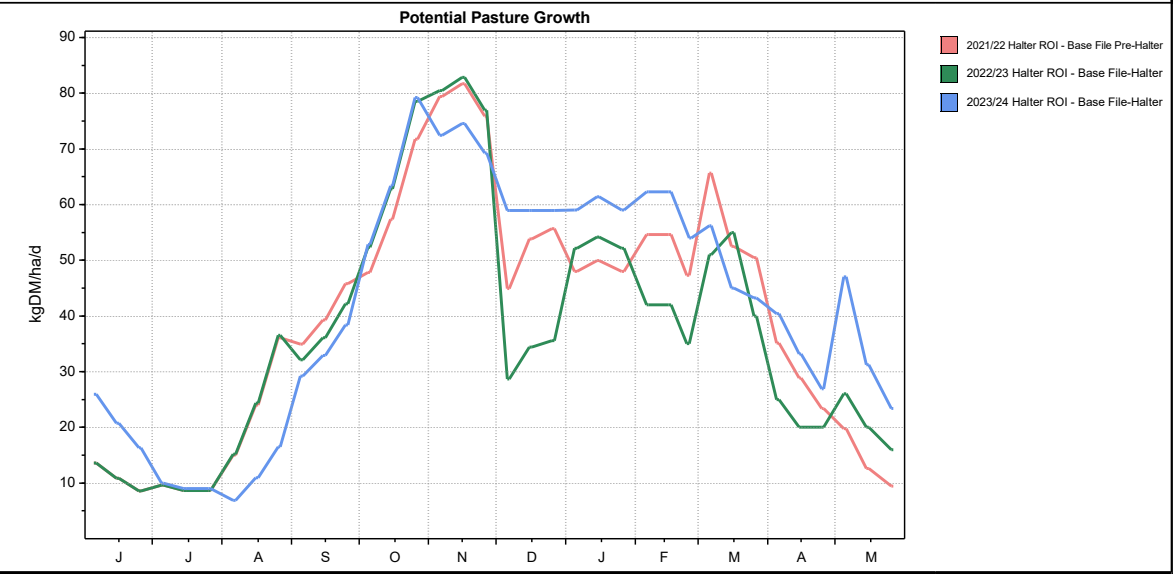
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FARMAX

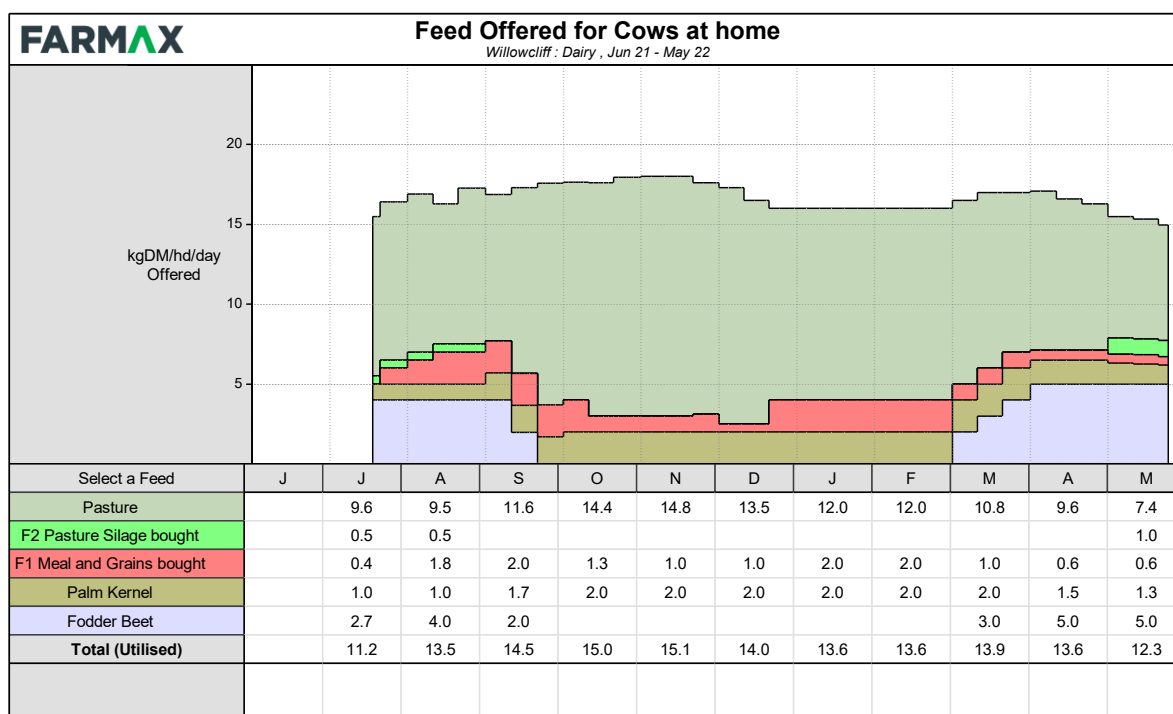
Compare Cover



Farmax Dairy 8.3.4.17

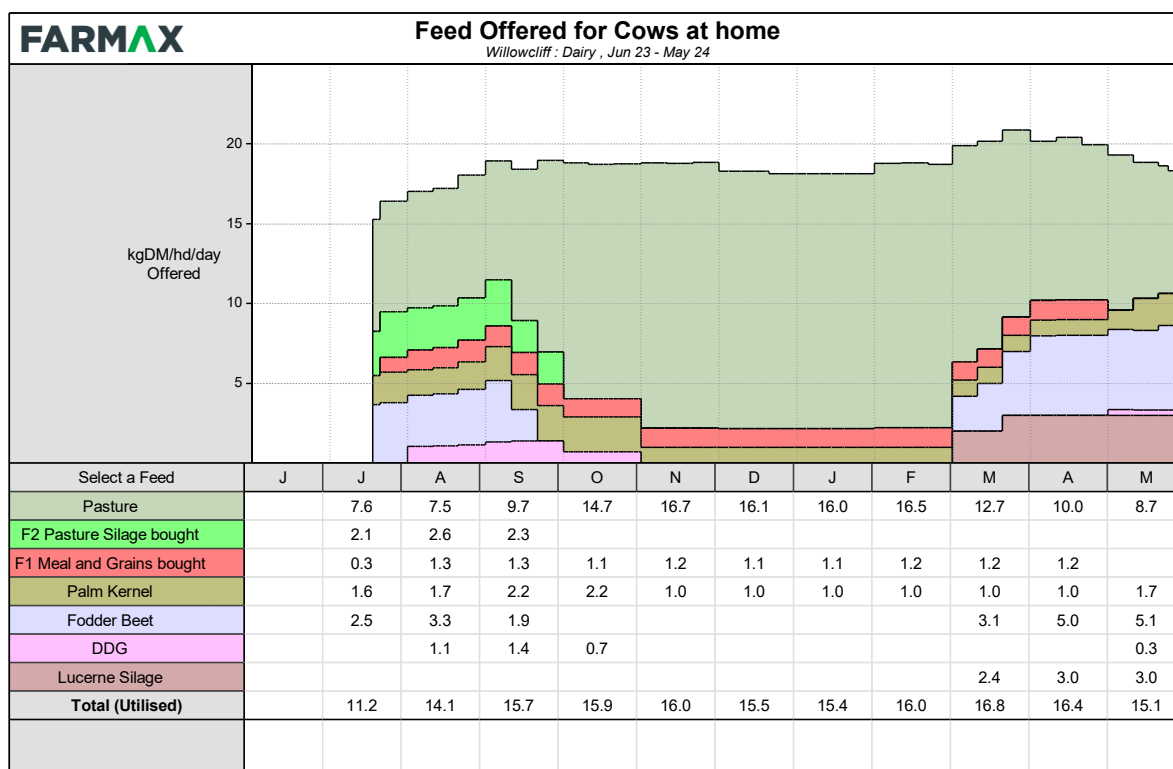


Pre-Halter – Milker feeding



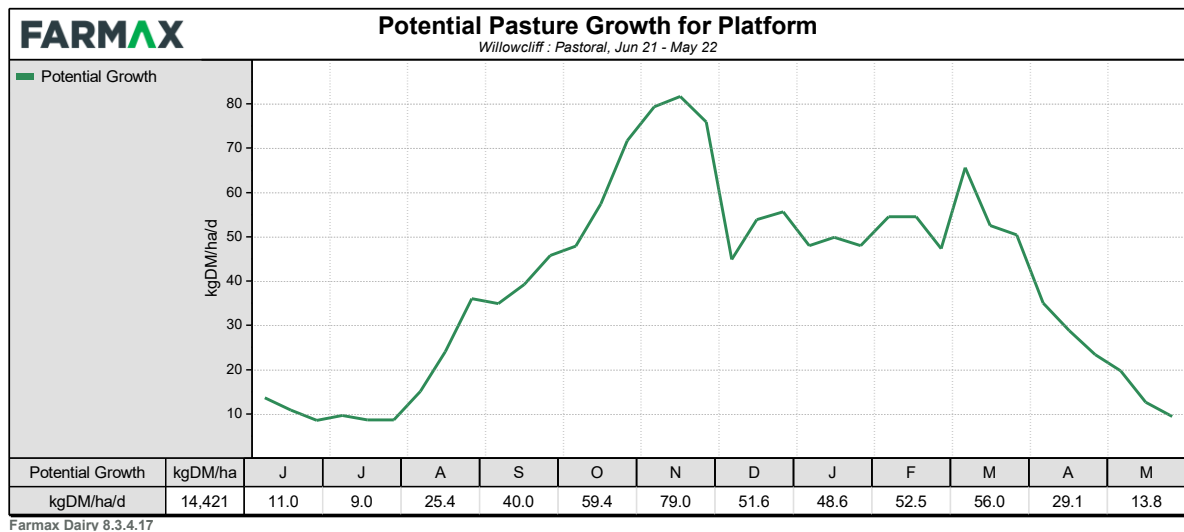
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Post-Halter – Milker feeding

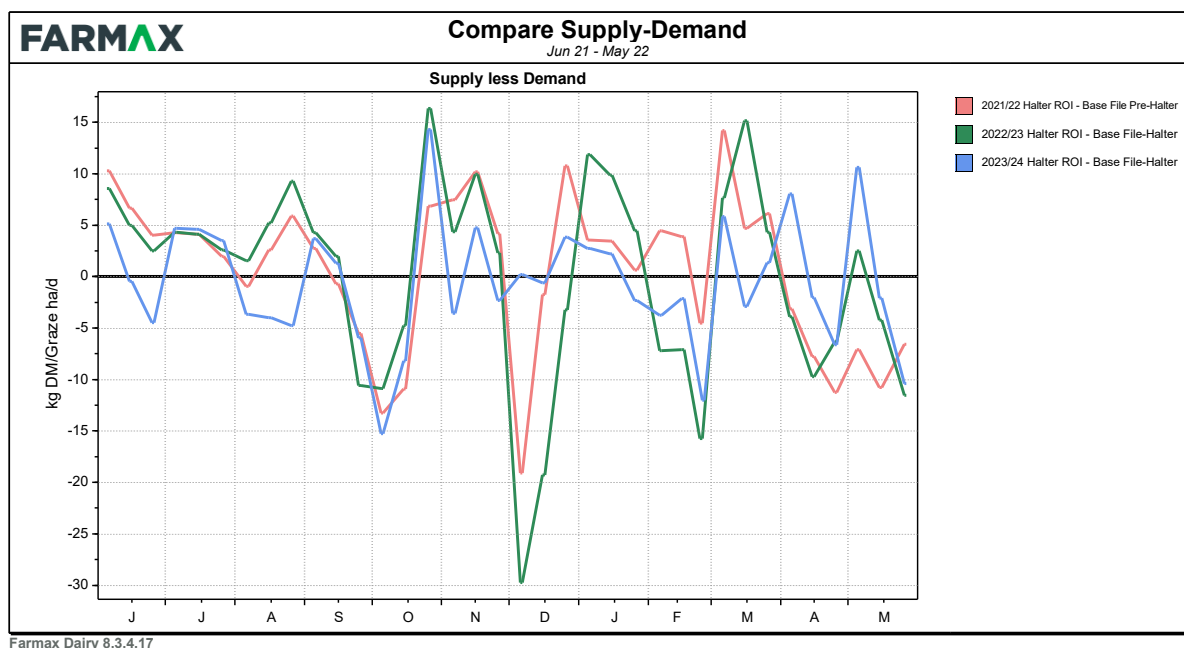
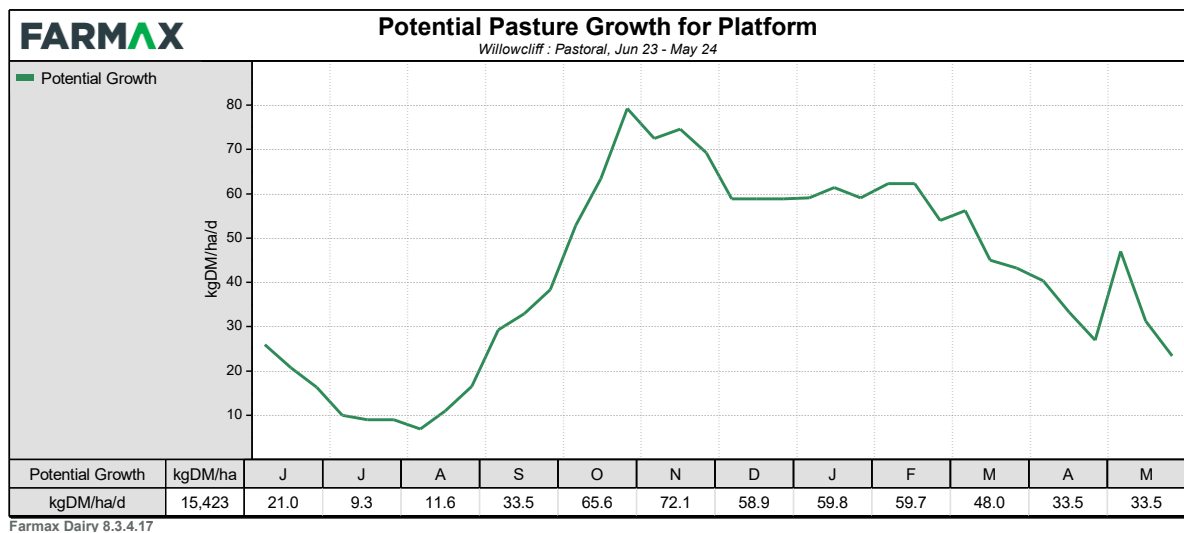


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Pre-Halter - Base Growth rates



Post-Halter - Base Growth rates



Compare Physical Summary

Jun 21 - May 22

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Herd	Cow Numbers (1st July)	1,268	1,323	1,277	cows
	Peak Cows Milked	1,252	1,317	1,269	cows
	Days in Milk	267	263	278	days
	Avg. BCS at calving	5.4	5.4	5.6	BCS
	Liveweight per total ha	1,593	1,562	1,631	kg/ha
Production (to Factory)	Milk Solids total	565,843	648,276	671,635	kg
	Milk Solids per total ha	1,561	1,788	1,853	kg/ha
	Milk Solids per cow	452	492	529	kg/cow
	Peak Milk Solids production	2.20	2.32	2.31	kg/cow/day
	Milk Solids as % of live weight	98.0	114.5	113.6	%
Feeding	Pasture Eaten per cow *	2.7	2.7	3.2	t DM/cow
	Supplements Eaten per cow *	1.3	1.6	1.5	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	0.6	0.5	t DM/cow
	Total Feed Eaten per cow *	4.7	4.9	5.2	t DM/cow
	Pasture Eaten per total ha	9.7	10.0	11.6	t DM/ha
	Supplements Eaten per total ha	4.7	5.7	5.1	t DM/ha
	Off-farm Grazing Eaten per total ha	4.2	4.7	4.4	t DM/ha
	Total Feed Eaten per total ha	18.5	20.4	21.0	t DM/ha
	Supplements and Grazing / Feed Eaten *	41.5	44.7	38.0	%
	Bought Feed / Feed Eaten *	19.1	24.6	21.6	%

(*) feed eaten by females > 20 months old / peak cows milked

FARMAX		Compare Forecast Profit and Loss				
Jun 21 - May 22						
			2021/22 Halter ROI - Base File Pre-Halter	2022/23 Halter ROI - Base File-Halter	2023/24 Halter ROI - Base File-Halter	
Revenue	Stock	Net Milk Sales - this season	5,072,216	5,811,769	6,024,072	
		Net Livestock Sales	211,102	211,102	211,102	
		Total	5,283,319	6,022,871	6,235,174	
	Crop & Feed	Capital Value Change	0	0	0	
		Total	0	0	0	
	Total Revenue			5,283,319	6,022,871	6,235,174
Expenses	Wages	Wages	455,000	315,000	315,000	
		Management Wage	110,000	110,000	110,000	
	Stock	Animal Health	180,380	172,985	180,525	
		Breeding	93,300	89,475	93,375	
		Farm Dairy	22,392	21,474	22,410	
		Electricity	47,272	45,334	47,310	
	Feed/Crop	Pasture Conserved	5,040	5,040	5,040	
		Feed Crop	69,000	85,100	85,100	
		Bought Feed	538,274	790,265	665,553	
		Calf Feed	7,548	7,553	7,549	
	Grazing	Grazing	740,689	843,007	759,699	
	Other Farm Working	Fertiliser (Excl. N)	102,225	102,225	102,225	
		Nitrogen	77,619	139,005	140,199	
		Irrigation	174,000	174,000	174,000	
		Regrassing	23,920	23,920	23,920	
		Weed & Pest Control	8,700	8,700	8,700	
		Vehicle Expenses	39,875	39,875	39,875	
		Fuel	39,875	39,875	39,875	
		R&M Land/Buildings	145,000	145,000	145,000	
		Freight & Cartage	3,625	3,625	3,625	
	Other Expenses		221,256	213,192		
	Overheads	Administration Expenses	68,875	68,875	68,875	
		Insurance	47,125	47,125	47,125	
		ACC Levies	10,875	10,875	10,875	
		Rates	29,000	29,000	29,000	
	Total Farm Working Expenses			3,039,609	3,538,589	3,338,047
	Depreciation					
	Total Farm Expenses			3,039,609	3,538,589	3,338,047
Economic Farm Surplus (EFS)			2,243,710	2,484,281	2,897,127	
Farm Profit before Tax			2,243,710	2,484,281	2,897,127	
Farm Profit per ha before Tax			6,190	6,853	7,992	
EFS is a measure of farm business profitability independent of ownership or funding, used to compare performance between farms. EFS should include an adjustment for unpaid family labour and management. This can be added to the expense database as management wage.						